Vol. II.—No. 12.] [APRIL, 1879.

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AND

JOURNAL

OF THE

Mineralogical Society

OF

GREAT BRITAIN & IRELAND

INSTITUTED 3rd FEBRUARY, 1876.

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THE MINERALOGICAL SOCIETY

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RECEIPTS.

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	£	s.	d.
By Balances from 1877	38	0	3
,, Composition Fees	21	0	0
,, Subscriptions for 1878	59	8	0
,, Arrears	48	16	0
,, Sale of Magazines (nett)	15	4	0
,, Authors' Reprints	3	8	6
	£185	16	9

EXPENDITURE.

Cr.

	£	s.	d.
To Lake & Lake, Printing, &c.	97	4	3
,, Carriage of Parcels, Circulars, Letters, &c.	8	7	10
,, Postage of Magazines	3	16	3
,, Travelling Expenses	12	0	0
,, Clerical assistance and sundries	3	11	6
,, Tregaskis, for Printing and Bookbinding	2	18	6
,, Heard, Printing Circulars	3	0	0
,, Balance at Bankers	26	3	4
,, Balance in Secretary's hands	28	15	1
	£185	16	9

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Due for Magazines	9	0	0
	£123	18	5

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Net Credit Balance	85	10	11
	£123	18	5

TRUST ACCOUNT, DECEMBER 1878.

Investment in 3 per cents.	£113	7 2
Interest to date	4	16 0
	£118	3 0

BOOKS RECEIVED TO APRIL 30TH, 1879.

From *Prof. Groth*, Strasburg. Zeitschrift für Kryst. und Min. Band III, Heft 2, 3.
" " *Jas. D. Dana*, Newhaven. American Journal of Science, Feb. to April, 1879.
" " *D'Achiardi*, Pisa. Atti della Societa Toscana de Scienze Naturali, Vol, III, fasc 1, 2.
" " Ditto. Procesi Verbali, pp. XXXXIX to LXXXVIII.
" *W. D. Roebuck*, Leeds. Trans. Yorkshire Naturalists Union, Part I, 1879.
" *Reale Comitato Geologico*, Rome. Bolletino 1 e 2, 1879.
" *Prof. How*, Nova Scotia. Report of the Department of Mines, N.S.
" Ditto. The Iron Ores of Nova Scotia.
" Ditto. Reports, &c., of Marble Mountain, Cape Breton.

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IRON CRYSTALS *(See p. 223).*

Fig. 1.

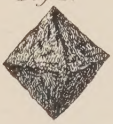


Fig. 3.

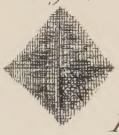


Fig. 4.

Fig. 2.

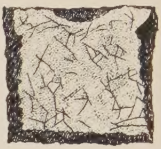
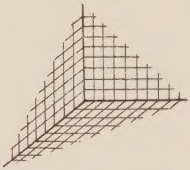


Fig. 5.



QUARTZ CRYSTALS.

Fig. 6.

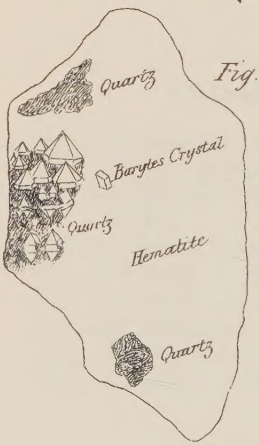


Fig. 7.

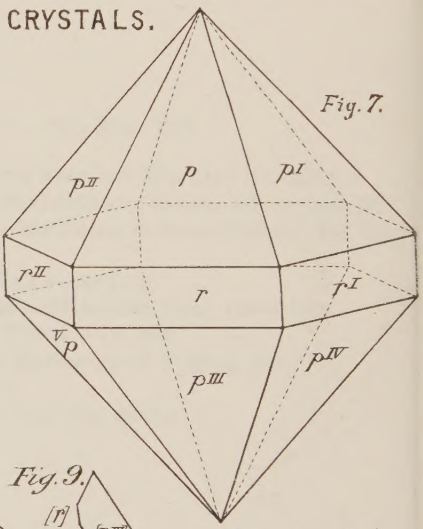
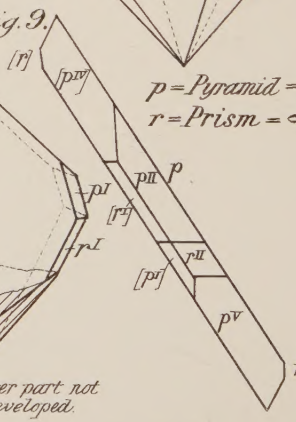
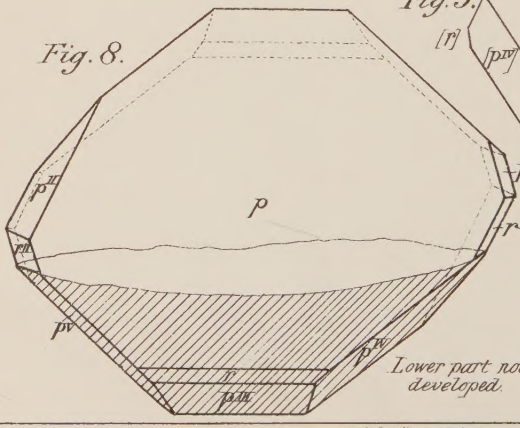


Fig. 9.



p = Pyramid = P (naum
r = Prism = ∞P (naum

Fig. 8.



LAKE & LAKE, LITH. TRURO.

THE MINERALOGICAL MAGAZINE

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MINERALOGICAL SOCIETY OF GREAT BRITAIN AND IRELAND

No. 12. APRIL, 1879. Vol. II.

XXII.—*A Brief Description of the Map of Shetland, issued with Vol. II of the Mineralogical Magazine.*

By Professor Heddle.

THE accompanying map is the outcome of a survey of Shetland, conducted during part of several summers.

Almost the whole of the junctions laid down were visited by myself; for the few that were not, and also for certain of the lines continued inland—which from an almost unbroken covering of peat and turf, are more or less conjectural—I am indebted to Dr. Hibbert's narrative.

To Professor Geikie's map of Scotland I am indebted for the southern limit of the isolated mass of sandstone of the Lerwick district.

The small strip of volcanic rock on the west side of Noss Sound was observed in 1878 by Messrs. Horne and Peach of the Geological Survey; that in the island of Noss was observed by myself in 1848.

I have, after considerable hesitation, assigned to the two rock-masses which lie between Gruting Bay and Melby on the west of the large island, the age of the Old Red Sandstone.

I have noticed, in the text of my papers in the Magazine, the observation by myself of doubtful organisms in the vicinity (north-west) of Veila Sound; and Professor Geikie tells us* that his two officers, above-named, last-year discovered "numerous plants evidently similar to

* Transactions of Royal Society of Edin., Vol. XXVIII, part 2.

those of Lerwick in the altered sandstones or quartzites south of Melby:"—namely in the west of the mass.

This rock was considered, both by Hibbert and by Nicol, as true quartzite. To me it seemed of much the same nature as the peculiar rock which is found on the east shore of Foula, and which I have (while indicating that I had not sufficient opportunity of studying it), set down as showing a probable passage of the underlying schists into the members of the Old Red Sandstone series,—and hence as being truly of that age.

If the red sandstone of Sandness Hill be really Old Red, it is the most highly altered member of the series to be seen probably anywhere in Scotland.

Rocks of a seemingly intermediate character, also occur on the east shore of Fetlar in the neighbourhood of Helinàbretta; and compose the weird rocks termed the Ramnay Stacks, which outlie the Point of Fethaland.

Granites of three descriptions occur in the Island.

First, that which in the south runs up like a great dyke from Quendale Bay in the direction of Mavisgrind; this I believe to be continuous with the wide mass which includes the Islands of Yell-Sound; though here it contains little of the epidote which it carries in the south.

This mass, in the south at least, cuts the strata sharply off, and seems to plug a rent.

The small mass in the north-east of Unst can hardly be regarded as distinct from this.

Second, the porphyritic granite which forms a triangular wedge between Seelie and Gruting Voes:—this sends down veins through the schists of the west shore of the first-named Voe.

Third, an evidently more recent rock—and one which presents some of the characters of vitreous fusion—which lies westward of, and above all the metamorphic rocks of the islands. To this last mass, Messrs. Horne and Peach assign a much more recent date, but the grounds of their speculation are not yet before the public.

A *guide-course* has been dotted on the map; and I now note the minerals of which there is a reasonable hope of obtaining good specimens in a hurried, and what might be called a *sight-seeing tour* in the country.

Sandlodge.

Malachite—Chalybite—Limonite.

Seelie Voe.

Purple quartz—Porphyritic granite.

Bigsetter Voe.

Graphic albite.

Hillswick.

Radiated Hornblende — Pink albite—Actynolite — Anthophyllite — Precious serpentine—Purple quartz—Ripidolite coating magnetite—Kyanite—Margarodite—Chlorite—Talc.

Pundy Geo.

Magnetite in chlorite—picrolite

Colafirth.

Various serpentines—Black radiated hornblende—Actynolite—Chrysotile—Albite.

Balta.

Hornblende—Augite—Labradorite—Amianthus—Nephrite—Picrolite and various pseudomorphosed varieties of the above.

Swinaness.

Precious serpentine—Brucite—Asbestus.

Chromite Quarries.

Kammererite—Hibbertite—Chromite.

Cross Geo.

Green talc—Breunnerite—Dolomite—pseudo-diallage in rolled pebbles.

Woodwick.

Grenatite—Kyanite.

Fetlar.

Chrysotile—Hornblende—Anorthite—Chromiferous magnetite—Diallage—Serpentines.

Haaf Grunay.

Precious serpentine—Pyroaurite.

XXIII.—*Supplementary Notes on the Val d'Anniviers.*

By Marshall Hall, F.G.S.

REFERRING to my notes in number 3 of the Mineralogical Magazine for 1877, I observe one or two little matters which I hoped the march of time would improve. One desideratum, a good hotel, the Hotel d'Anniviers, has been established at Vissoie, and M. Monnet, the landlord, is a man of intelligence, and, without pretending to scientific lore, has much information concerning the mining, geology, botany and history of the neighbouring valleys. Jean Martin, my guide in many a tough scramble, has married, and established a small restaurant with a couple of bedrooms at Vissoie, which place may now fairly be said to have become a centre for many interesting excursions; as, to the Bella Tola, whence the panorama is very grand,—to the Cols leading from the Grimenz Thal to the Val de l' Arolla and Evolena, and also to the Turtman Thal, and so across to St. Niklaus in the Zermatt valley.

On the other hand, they have not carried on the char road to Zinal, and a mule path it still remains. Nor have they, in spite of the frequent urgings of myself and other travellers, built a little Inn on the Alp d' Arpitetta, whence is one of the sublimest views of the giant mass of the Weisshorn, and which is in itself a good sub-centre for mountain expeditions.

The summer of 1878 was very unfavorable for mountaineering, and I was unable, during a week spent in the valley, to explore the rock masses at its head as I had hoped to do. It is a sad reward of a hard climb of some hours to be beaten back by bad weather from the spot almost within reach where one could have solved some problem with but little further bodily labour. I was not fortunate. Still I became generally acquainted with the nature of the rocks forming the sides of the great glacier basin at the valley head.

Ten minutes' walk from the hotel at Zinal, on the west side of the roaring Navigenze, is a curious mass of dolomitic rock, with occasional occurrence of gypsum, and efflorescence of saltpetre. This rests on what Gerlach considers as "elder metamorphic schist." Above this dolomite, half-way to the summit of the Garde de Bordon the rocks are composed

of M. Lory's "schiste lustré," which has been referred to the Triassic age by good authorities. I was twice prevented from climbing to the point of junction of these masses, and on one occasion got myself into a difficulty of which, as an old Alpine man, I felt rather ashamed. My object was to see the relations of the dolomite with the schists above it. Half-way up the Garde de Bordon this "schiste lustré" yields place to a hornblendic schist, also commonly referred to the Trias. Many of the Swiss savants, M. Renevier for instance, refer all dolomites in that country and all gypsum, except of course mere fragments, to the lowest of the Lias or the highest of the Trias; we may say to the lower portion of the Rhœtic beds. Now it appears to me that the evidence to be gained by an effective exploration of this dolomite will be of much value, as regards both its own age and that of the schists above it, accepted, I believe, as of Upper Triassic age. The question is a complicated one. Gerlach, in a section through the Dent Blanche, accompanying his "Karte der Penninischon Alpen," represents the mass of that peak as consisting of Talcose Gneiss, whilst fan-like strata crop steeply out on the N. and S. flanks, the synclinal axis being apparently right under the base of the mountain. Amongst these strata he places the "schistes lustrés" higher than the dolomite. With due deference to the undoubtedly high authorities I have consulted, with no facilities in the way of libraries nearer than Lausanne, I look forward to an opportunity of overhauling the evidence as to the age of schists and dolomites with great interest.

A fortnight ago I had the advantage of exploring the salt mines near Bex, under the guidance of a distinguished Swiss geologist, Monsieur S. Chavannes who, having formerly been Pasteur at Bex, and also at Les Ormonds for many years, became exceptionally familiar with that district. Of what I saw underground I have not now to speak, but one thing I did most certainly see in the gypsum-bearing strata round Bex was that the metamorphosis of limestone rock into gypsum is going on palpably under the very nose of the explorer. I say this without prejudice to the question whether or not these great masses of gypsum owe their origin to the evaporation of seas. In the mine is an escape of gas which, after a strong explosion, has been kept constantly burning for some time past. Also I have now on my hands the analysis of an efflorescence or, rather, a deposit on the wall of the adit, containing carbonates of lime and magnesia, and also free sulphur and sulphides. The inference is that organic matter, oxygen and sulphur are at the present day all available, and with these much natural "manipulation" of rocks must take place. I am not prepared to pursue this subject, which is a large one. But replacements, hollows from gas bubbles, vesicular rocks and such like evidences are to be met with at each turn, not merely in the mines, but "at grass."

A question somewhat similar to that of the Val d' Anniviers arises with regard to the rocks on the E. side of the Simplon Pass. The second of two sections published in the "Bulletin de la Société Vaudoise des Sciences Naturelles," March, 1878, illustrating a paper by Professor E. Renevier, on the "Massif du Simplon" is well worth procuring. and is published as a separate pamphlet by Rouge et Dubois, of Lausanne. In the valley of the Rhone the following beds in descending order are represented as separating "schistes noirs" to the north from "schistes lustrés gris" to the south, and as dipping something like 40° S.—schiste lustré, gypsum, dolomite, gypsum and schiste noirs. Here we have much the same difficulty in realizing that *if* gypsum and dolomite are lowest Lias or uppermost Trias, the age of the schistes lustrés can be, as Gerlach has it in his map, also Triassic. If, as is proved, he is right, we have a very pretty bit of evidence, in the repeated association of these rocks in these two localities, as to the age of two great masses of schist, evidence all the more important from the paucity of fossils in this country. Mineralogical facts are, as regards the schists of the Pennine Alps, the probable key to their geological age. In this section of the Simplon route there are other questions worth the time and close attention of the field investigator.

The "schistes lustrés" of the Valais are separated from gneiss and from other quite distinct schists on the flanks of the Wasenhorn by a bed of dolomite dipping N. at an angle of about 80°. Here have we a dolomite of the same age, a replication of the other?

The Simplon, I may be allowed to add, affords yet another question for the geological mineralogist. The mass of schist forming the Monte Leone is divided in two places by bands of saccharoid limestone dipping N. at steep angles, and very similar in nature and thickness. A third band separates these schists from the gneiss of the Val d' Antigorio, and this third band, again, has the same character and a similar dip.

Professor E. Renevier, a distinguished geologist, observes the importance of ascertaining whether these calcareous bands are identical, with replications, faults, or other causes for their apparent repetition, or whether they alternate with the enormous masses of schist in which they occur. He remarks, as I do with regard to the dolomite and gypsum of the Val d' Anniviers, that they may be the means of throwing light upon the ages of the metamorphic rocks. To quote his own words:—"Celui qui réussirait, en effet, à démontrer que nos trois bandes calcaires ne sont que trois affleurements d' un même banc, tiendrait la clef orographique de nos Alpes crystallines, car l' élucidation de ce point aurait une portée générale pour l' ensemble de la chaîne des Alpes." This is so mineralogical a question that it excuses the length of my geological dissertations.

Both these details can probably be worked out with no actual hard climbing, though not without considerable walking labour, in the midst however of very magnificent scenery, in unhackneyed parts of this country.

Returning to our valley, I quote the words of my notes respecting the rocks opposite Zinal which "have partly fallen down, many of the masses are tufaceous I may call them cargneule. The schist adjoining is much decomposed, and I failed to obtain a good specimen of their contact. Associated was a carboniferous shale, and then the schist became more compact. Above this again, but out of my reach, seemed a further mass of tufa, and there was a curious cavern where I saw traces of a fox decidedly *recent*, and a few feathers of the domestic fowl! These lower strata dipped at angles of from 10° to 15° N.W."

On the same—the W. side of the valley—but near the foot of the great Zinal glacier, in the precipices, are to be seen indications of copper minerals, and on ascending the débris and climbing the rocks I found a short level of 7 to 10 yards had been driven into rock rich in quartz, but beyond a little very poor pyrites and some silicates there was nothing to be found. Quartz and calc spar were the chief minerals, and the rocks were not easy to refer to a distinct class, but seemed to me schistose and to be very close to a junction with Lory's "schiste lustré."

The lode, if it be worthy to be called one, dipped 12° S.W., and I subsequently found traces of similar lodes in the all but inaccessible west flanks of Lo Besso, on the opposite side of the valley, occurring at such an additional elevation as to seem to have the same amount and direction of dip. Again, in the Grimenz Thal which bifurcates from the Val d' Anniviers, nearly opposite Vissoie are mines at a height which I imagine, from what I have been told, to correspond to about the same dip; but I have not personally verified this. The mines at La Barme also may be about the same zone. Those above Ayer appeared to me higher up, but these are points to be cleared up on another occasion, weather permitting. Or, on a visit to Berne, I may be able to obtain the correct levels from the topographical department. I believe none of the mines are now being worked. The various ores contain Lead, Nickel, Cobalt, Arsenic, Bismuth, Copper, and Hematite. I believe none of the mines are being worked, but I was told that a law suit is pending as to those in the Grimenz valley, which is very likely a more profitable thing to some concerned than most mining.

With regard to the rocks surrounding the great Zinal or Durand glacier, the points at which I have been able to inspect them for myself are:—the steep mass on the W. forming the buttresses of the Pigne de l' Allée and the Bouquetin, the precipices of the Trift Joch, the Pointe de Mountets, the Mountets themselves, the lower rocks of Lo Besso, and, below the

glacier, the Pointe d'Arpitetta, and right in the middle of the ice basin the Roc Noir, a magnificent point of view. To generalize, I may say, I believe the whole to consist of talcose rock, more or less legitimately to be called gneiss, and the whole of this gigantic mass dips away towards S. and S.W. Below the glacier the rocks consist of chloritic and epidotic schists for some distance. Then we enter upon the schistes lustrés, and, at Zinal, on the right bank of the Navigenze, is a patch of protogine (?)

Let me sum up the cargneule question. In a climb W. of Zinal we cross successively the following rocks, numbered according to Gerlach's tabulation of their age, not in the order met with :—(1) older talc schist, a little quartzose rock, then (3) dolomite and cargneule, then (4) schiste lustré, and then (2) chloritic schist. Is this identical with the cargneule which Renevier places *under* the Rhœtic beds, which again he places at the bottom of the Lias? If so, can the schistes lustrés be triassic, and was there such a geological period between the dolomitic and Rhœtic beds as this must have required? The weak point of my evidence is my failure to make out the relations of the cargneule, &c., with the schiste lustré. I hope this summer some one will take this in hand; and to all climbers I say—do not trust that blessed tufa!

A week might be profitably spent as follows :—First afternoon ascend from Sierre to St. Luc, where sleep. Early next morning ascend the Bella Tola, descending to Vissoie, on the way making détours to inspect the workings of the "old men." Next day go up the Grimenz Thal and ascend the Becs de Bossons, or some point on that side the Grimenz Thal, (M. Monnet's advice can well be taken, or that of Jean Martin, the guide), and return to Vissoie. Next day go a short distance up the Grimenz Thal and climb that side of the pointe de Sorrebois so as to inspect the mines and also the occurrence of gypsum, descending to Zinal. Another day ascend to the Roc de la Vache, and descend to the châlets of Arpitetta, whence continue to les Mountets, to which provisions, fuel and wraps must be sent. From the Alpine Club cabane there, it is worth while next day to ascend the Roc Noir, unless there be an intention to cross one of the high passes to Zermatt, which is a mountaineering trip and thoroughly worth the while. If any more time is available, instead of ascending from the Arpitetta to Mountet, return, crossing the glacier to Zinal; next day explore my tufa, and at mid-day ascend to Mountet to sleep. With these and other excursions a fortnight could be well occupied in and about these valleys, independently of rests.

XXIV.—*Additional Note on Iron Crystals, and on some Distorted Quartz Crystals.*

By J. H. Collins, F.G.S.

THE Iron Crystals described by Mr. Beardsley in the present volume of the Mineralogical Magazine (p. 223) exhibit the remarkable structure illustrated in figs. 1 to 5, plate VII. Fig. 1 represents the crystals drawn natural size, and fig. 2 is a section of one of them in a plane parallel to a face of the cube—shewing the structure developed by etching. Figs 3 and 4 illustrate other modifications of structure which have been observed in iron crystals, and for which I am indebted to Dr. C. O. Trechmann of Hartlepool, and fig 5 may perhaps indicate the ultimate molecular structure. (See also Wöhler. Pogg. Ann., Vol. 26, 1832, where cubes and octahedrons of iron are described, having cubical cleavage.)

The Quartz crystals illustrated in plate VII, were found by me on some remarkably pure specimens of crystallized red hematite, from Hodbarrow Mine, in Cumberland, for which I am indebted to Mr. Solomon Birkett, an associate of the Mineralogical Society. Among some specimens sent are some interesting pseudomorphs to which I propose to call attention in a future paper.

The crystals in question occur in groups—the well-formed individuals being less than $\frac{1}{8}$th of an inch diameter. There are also some barytes crystals present. Thinking they were somewhat peculiar, I sent them to Dr. C. O. Trechmann of Hartlepool, who has been kind enough to measure them, and to write to me as follows :—

"The quartzes are very highly distorted crystals of the ordinary form, prism (∞ P, *Naum*) and di-hexagonal pyramid (P). I could see no other form. The accompanying sketch (Fig. 6, Pl. VII) shews the general aspect of the crystals—one of which is represented in fig. 7. The crystals are so to say unfinished, *i.e.*, each is an agglomerate of small

crystals in parallel position, which, on addition of further quartz matter, would probably have developed into single regularly formed crystals.

Figs. 8 and 9 represent a single small crystal taken from one of the masses of hematite. Its elucidation was impossible without the aid of the goniometer, but then it at once revealed itself. The figs. are drawn as true to nature as possible, and will give you a good idea of the excessive distortion of the little crystal. I have drawn fig. 8 parallel to fig. 7, and marked the corresponding faces with the same letters. Fig. 9 is a side view of fig. 8."

Reviews and Notices.

On the Aluminite of Kralup, Bohemia.—By R. Raffelt. (*Report Imp. Geol. Instit. Vienna*, November 19, 1878.)

This mineral has lately been found in small white reniform masses in a Quader-sandstone, with traces of coal, plant remains, and saline efflorescence (probably alum). Its chemical components are: Alumina, 89·84, sulphuric acid, 23·15; water, ·47; thus corresponding with the formula of Aluminite, $Al_2 SO_3 + 9 H_2O = \left.\begin{matrix} Al_2 O_3, 3 SO_3 \\ 2 (Al_2 O_3, 3 H_2O) \end{matrix}\right\} + 21 H_2O$

T. R. J.

On some African Laterite.—By Dr. O. Lenz.—(*Report Imp. Geol. Instit. Vienna*, November 19, 1878.)

The term "Laterite" is applied to a sandy and highly ferruginous loam, containing abundant and often very large concretions of hydrated oxide of iron, which is extensively spread over certain regions of tropical Asia and America, and covers wide areas in tropical Africa. In both east and West Africa the laterite seems to be connected, as to its extent, with gneiss and other schistose rocks of crystalline texture. A specimen of laterite from a sandy and intensely yellow loam on the banks of the estuary of the Gaboon, and probably a *derived* block, transported by water, was subjected to chemical analysis. Its specific gravity was 3·44; and it was found to contain, in a hundred parts—substances insoluble in hydrochloric acid (Silica, 10·40, Alumina, 5·42) 15·82; Alumina, 12·40; Oxide of Iron, 58·02; besides traces of Silica soluble in hydrochloric acid, and of Manganese; water set free at 100°C., 2.45; water set free by incandescence of the substance dried at 100° C., 12·95. Consequently this laterite is hydrated oxide of iron with an admixture of some silicate and hydrate of alumina. The portion insoluble in hydrochloric acid is a mixture of quartz with a kaolin-like substance. The soluble portion is essentially composed of the hydrates of alumina and oxide of iron. Neither sulphur nor phosphorus being present, this laterite must be regarded as a good iron-ore. The natives of Central Africa, who, low as they are in the scale of civilization, are frequently able blacksmiths, use the iron extracted from this laterite. Iron is also extracted from laterite in India and Brazil. In some parts of India and at Gaboon laterite is used as a building material.

T. R. J.

ON HALLOYSITE FROM TÜFFER, STYRIA.—By K. John.—(*Report Imp. Geol. Institt. Vienna*, Dec. 3rd and Dec. 17th, 1878.)

This mineral has lately been discovered by Mr. Ihne, Superintendent of the Coal-mines of Hrastnigg. It occurs in extensive, thick, vein-like agglomerations in the porphyry of Tüffer, without any admixture of other substances, in the form of irregular nodules of various sizes, frequently with a pellucid, steatite-like central nucleus, passing outwardly into a pure-white substance, greasy to the touch, in which are occasionally included minute pellucid granules. Outside, it passes into an earthy friable substance. All these varieties are connected by insensible transitions. Light-rose-coloured veins are visible in some specimens. The mineral adheres strongly to the tongue. Its specific gravity is 2·071. The results of chemical analysis are:

	Pellucid variety.	White compact variety.	Friable white variety.
Silica	38·37	38·68	40·07
Alumina	33·31	33·02	34·53
Water, set free at 100° C.	15·75	14·97	12·30
Water, ,, above ,,	13·05	13·23	13·50
	100·48	99.90	100·400

Thus the chemical composition, omitting the water, is $Al_2 O_3\ 2\ Si\ O_2 = Al_2 Si_2 O_7$. The proportion of water is variable, being greatest in the pellucid variety in the centre of the nodules; and therefore it may be admitted to have given rise to the other varieties by decomposition, namely by loss of water.

In the pellucid variety when reduced to fine powder, and exposed to the open air for some time, the quantity of water sank to 21½ per cent. As the mineral retained a constant proportion of water when dried at 100°C. it must be admitted that water is in chemical combination; and doubtless constitutes, as usual, a centre of attraction for more water according to circumstances.

The mineral dried at 100°C. is composed of

Silica	46·43	*Per cent.*
Alumina ..	39·72	
Water ..	13·85	

The composition of kaolin is,

Silica	46·40	*Per cent.*
Alumina ..	39·68	
Water ..	13·92	

The formula of both these minerals is $Al_2 Si_2 O_7 + 2\ H_2O$.

T. R. J.

On Two New Resinous Minerals, Muckite and Neudorfite.—By J. Von Schröckinger.—(*Report Imp. Geol. Instit. Vienna*, Dec. 17th, 1878.)

These minerals have lately been discovered by Mr. Muck in the coal-beds worked near Neudorf in Moravia. This coal formation consists of two unconformable sets of beds, which strike north and south for 14 kilometres, and *dip* 10°—12° to W. Their *roof* is a black clay, overlain by Pläner-sandstone (Cretaceous). Their *floor* is a sandstone, strongly impregnated with coal at top, then reddish-brown in colour, and at last white, with an argillaceous cement. The mineral from the lower of the two coal beds, and for which the name "Muckite" is proposed, is disseminated throughout the coal in morsels of from 1 millimetre to 3 centimetres in size, and in small bands. In colour it is opaque yellow, or light-brownish yellow, and pellucid, with vitreous lustre. Its density is 1·0025; hardness between 1 and 2 of Mohs's scale. Alcohol dissolves 14 *per cent*; ether, 40 *per cent;* both solvents leaving a yellowish-brown residue. Sulphuric acid dissolves it into a dark-reddish-brown liquid, from which it is precipitated by water in a flocculent form. When oxidized by nitric acid, and the solution is diluted with water, a yellowish resinous acid is obtained, which gives a yellow solution with alcohol,—and when treated with potash, a reddish-brown resinate with musk-like odour. Heated to 120°C., the mineral assumes a deep yellow tint, darkening as the heat increases, until at 260° it becomes dark-brown. The point of fusion is between 290° and 310°. Melted *in vacuo* it becomes opaque, and resembles yellow amber. Heated in contact with the air, it emits a turpentine-like smell, and gives a sooty flame, without leaving any residue. Dry distillation gives a thick, oily, yellow liquid, changing to greenish, of poignant aromatic odour, becoming brown and resinous when exposed to the air for some time. The residuum in the retort is very brittle, friable, nearly black, opaque, with intense vitreous lustre, nearly insoluble in caustic potash, readily soluble in ether and benzole, melting at 80° C., giving off at greater heat an aromatic smell, like that of pine-resin, and burning with a sooty, lucid flame.

The average result of four analyses is—

Carbon....	79·22	*Per cent.*
Hydrogen..	9·57	
Oxygen ..	11·21	

answering to the empirical formula—$C_{20}\,H_{28}\,O_2$. This, however, is far from exact, as the solubility of the substance indicates that it is a mechanical mixture of different resins. The percentage composition of the oily liquid, obtained by distillation (Carbon, 83·52; Hydrogen, 8·81; Oxygen, 7·67) leads to the supposition that it is a mixture of several hydro-carburets, some oxidized, others without oxygen.

The mineral from the *upper* coal bed occurs in rather larger pieces, easily detached from the surrounding coal. It nearly resembles the variety of Retinite called "Walchowite" by the late Professor Schrötter. It is, however, rather pale-yellow, with a waxy lustre; its fracture is conchoidal, and its specific gravity is between 1·045 and 1·060. The name proposed for it is "Neudorfite," from the locality where it has been discovered.

Dissolved in ether it leaves a whitish-yellow resinous powder, nearly insensible to the action of caustic potash, readily oxidized by nitric acid, soluble in heated sulphuric acid into a limpid reddish-brown liquid, from which it is precipitated unchanged by the addition of water. At 150° C. small fragments become pellucid, soft, and elastic; at 250° they adhere to each other, and take an intense dark-brown tint. The point of fusion is 280°. The melted portion cools into a transparent yellow resin, very similar to Succinite. The substances obtained by dry distillation are, an oily, brownish-yellow liquid with pungent aromatic smell; a very small amount of watery liquid; and scarcely any tar. The residue is an opaque, dark-brown, bright resin, insoluble in boiling alcohol, readily soluble in ether. Heated in contact with the air, it burns with a lucid, sooty flame, leaving between 1·5 and 4·3 *per cent.* of ashes. Traces of nitrogen (0·4 *per cent.*) and of sulphur were found. The per-centage analysis gave—

Carbon	78·4
Hydrogen	9·84
Oxygen	11·98
Nitrogen	0·14

answering to the hypothetical formula $C_{18} H_{28} O_2$, the nitrogen being neglected as adventitious.

The formula given by Prof. Schrötter for his Walchowite is $C_{18} H_{18} O_2$; Neudorfite thus contains a smaller proportion of oxygen, as is also proved by the results of dry distillation.

T. R. J.

ON SO-CALLED HYPERSTHENIC ANDESITE OF ST. EGIDI, LOWER STYRIA. —By E. Hussak.—*(Report, Imp. Geol. Instit. Vienna*, Oct., 31, 1878.)

The substance of this rock is of the pennine pyroxene-andesite type, and of the same structure as that of the lavas of Santorino, and the true andesites of Hungary, being a mass of minute prisms of light-grey pyroxene with a brown vitreous matrix In this there are also many relatively large crystals of plagioclase, and prisms of a light-green mineral, as seen in thin slices, which has been regarded by M. Niedziewsky as having the

crystallographic characters of hypersthene. The plagioclase is occasionally a millemetre in diameter, and includes an uncommon proportion of a brown vitreous vesicular substance, generally disposed in a rather broad zone. Sanidine is of somewhat rare occurrence; peridot is absent. Rectangular granules of magnetite are dispersed equally throughout the mass.

According to M. Niedziewsky, the mineral regarded by him as *hypersthene* appears in rhombic prismatic sections, longitudinal and transverse, some irregularly, others regularly defined, and greenish-grey in colour. The long sections have longitudinal parallel figures. The rhombic transverse sections, sometimes almost square, have two cleavages, one corresponding with a pinacoïd, the other prismatic and less distinct. Dichroism is scarcely perceptible; one of the optical primary sections is parallel to the longitudinal axis of the prism, and the other is vertical to the first.

A microscopical examination of thin slices in the Imperial Geological Institute gives the following results. The transverse sections of the light-green mineral are constantly octagonal, although nearly approaching the quadratic form on account of the prevalence of the pinacoid surfaces over those of the prism,—a peculiarity frequently observed in the pyroxenes of andesite-pyroxenes. The cleavage is decidedly prismatic, nearly rectangular in all transverse sections, without any trace of pinacoidal cleavage. Therefore longitudinal sections offer a cleavage parallel to the longitudinal axis, as in all such sections of pyroxene. Dichroism is scarcely perceptible. The intense pleochroism characteristic of hypersthene is absent, according to Dr. Tschermak. In the clino-diagonal longitudinal sections the optical primary sections are not vertical to each other, therefore the extinction is oblique, as peculiar to a monoclinal rather than to a rhombic pyroxene. In these sections the angle of extinction is very considerable, the stauromicroscope showing it to be between 24° and 30°. In some cases the long sections offer an optical orientation equal to that of the rhombic crystals. Such sections are from the zone O P : ∞P. In other sections parallel to the longitudinal axis the angle of extinction is only between 2° and 5°, the sections being somewhat inclined towards ∞P. The whole of these facts prove the light-green mineral to be merely a variety of pyroxene; and consequently the term "hypersthene-andesite" is not required in Petrography. The andesite of St. Egidi contains 61·37 *per cent.* of silica; other characteristic pyroxenic andesites have between 57 and 62 *per cent.* of this substance.

T. R. J.

Artificial Diopside.—*(N. S. Maskelyne, Phil. Mag. Feb.* 1879*).*

This was formed in a Bessemer converter at Blaenavon, and consisted of an interlaced mass of glistening gray crystals. A crystal found in a

cavity proved to be diopside, exhibiting the following forms; 110· 010· 221· 111. The following analyses are by Mr. Percy Gilchrist.

Fe O	1·63 ..	1·63
$Al_2 O_3$	2·47 ..	2·47
Ca O	19·50 ..	21·00
Mg O	14·45 ..	16·49
$Si O_2$	63·00 ..	58·75
	101·05	100·34

J. H. C.

ENSTATITE ROCK FROM SOUTH AFRICA.—*(N. S. Maskelyne, Phil. Mag. Feb. 1879.)*

This occurs at Korn Kopje and near Holfontein in the Transvaal. Under the microscope it presents all the characters of a very crystalline enstatite without affording evidence of the admixture of other minerals.

Its analysis is as follows:—

Silica	53·
Alumina	2·6
Fe O	9·27
Mn O	2·
Mg O	25·5
Ca O	6·6
	98·97

J. H. C.

ON A HORIZONTAL GONIOMETER.—*(V. Von Lang, Phil. Mag. Feb. 1879.)*

This cannot be understood without its accompanying illustration. It is intended primarily for the measurement of refractive indices at different angles of incidence.

J. H. C.

Obituary.

ANOTHER of our Members gone! But the other month it was Harkness, and nowit is Nicol. His very name was a prop to our society, and his eminence as a mineralogist deservedly placed his name upon the list of those who were, at its institution, deemed worthy of occupying the position of President.

Though a naturalist in the widest acceptation of the word, and for twenty-nine years a professorial teacher of it in all its branches, James Nicol early showed his predilection for Geology and Mineralogy; and his special eminence in the former of these sciences was largely due to that knowledge of petrology which his familiarity with mineral species conferred.

After some of Nicol's earlier descriptive papers had found their way as prize-essays into the Transactions of the Wernerian Society, he in 1844 published his "Geology of Scotland," which, though to a considerable extent an epitome of the work of others, yet bears evidence of a vast amount of personal labour; and, brief and sketchy though it be, is still the best general guide to the geology of the northern division of the kingdom which we possess.

As a mineralogist Nicol may be said to have taken the place left vacant by the death of Jameson. In 1849 he published his "Manual of Mineralogy," unquestionably the first work on the science which has been issued in this country, and invaluable at the time of its issue from the very full tables of analyses which it contains. In 1858 he issued a smaller work,—his "Elements"—this, which still forms the article "Mineralogy" in the Encyclopædia Britannica, has gone through a second edition.

As a practical geologist Nicol was untiring and almost untirable;—his powerful frame and lengthy stride enabled him to compass a distance, and attain, with seemingly no exertion, a speed, which even at a very recent date excited the admiration of the most stalwart walkers. Though professing "not to care much for climbing hills," he on one occasion ascended Ben Nevis in two and a half hours,—

being at the astounding rate of 1760 feet per hour, over the whole distance.

As a companion Nicol was a most lovable man; of sterling honesty of purpose, he disdained to flatter, and he disdained to agree if he believed he should differ.

Greatly beloved by his students, and still more greatly by those whom he adopted as his friends, the return of his affection was shown in deeds, not words: for these friends—to aid them if he thought he could do so,—he regarded no expenditure of time as lost time. Those younger than himself he specially strove to aid, and it was seldom that the resources of his memory and experience failed him in the so doing.

In the midst of the great sorrow of an unexpected and truly personal loss, the writer of these lines has to record, that in one special department of his own life-work there is no man from whose writings and from whose lips he has received so much aid as from those of James Nicol.

M. F. H.

Addendum.

The following bit of fun, flung by one Scotch Professor at another last spring, may not be considered out of place in our columns.

PROFESSOR IN EXCELSIS.

Hurrah! the Winter Session 's done,
My last "exam" is over:
My load is gone,—I skip as free
As ever mare in clover.

No Senate meeting haunts me now
With hours of dull debating;
Committees, Council, one and all
I leave them and their prating.

Three cheers for the merry month of May;
Well may I call it merry,
Although its chill east wind do tint
My nose-tip like a cherry.

We call it summer, though it spread
No leaf on bush or tree;
But never does it fail to bring
A holiday to me.

Go, wife, dear partner of my lot;
Rouse from their winter slumber
My wallet, hobnails, flask and stick,
And all my travelling lumber.

Bid Mary look my linen out,
The stockings I'm to put on;
And, darling, if you love me, see
To every absent button.

Myself I'll pack my hammers up
(Such gear my wife denounces),
From "Puffing Bill" that weighs two stones,
To "Trim Tom" of eight ounces.

My pocket compass, chisels, map—
(Field map with colours slurred on);
Of packing paper half a ream,
And bag for daily burden.

I'm sure I've thought of everything,
My wife and I together,
For day and night, inside and out,
For warm or wintry weather.

Nay, stop! my wife, of course, will look
For news and kind regards;
So put into my wallet still
A pack of postal cards.

And now I'm off, go fetch a cab,
A kiss to all at home;
Hurrah! hurrah! for the next four weeks,
O'er hill and dale I roam.

Hard work and mountain air will chase
All worry from my head;
And in the little Inns at night,
Two "tums," and then to bed.

Edinburgh. A. G.

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ERRATA.

Page 10, line 13 from bottom, for county *read* country.
,, 21, ,, 10 ,, top and throughout, for Quin *read* cross.
,, 27, ,, 18 ,, top, for Cu *read* Ca.
,, 27, ,, 18 ,, ,, *dele* c̈
,, 27, ,, 22 ,, ,, for 4·13 *read* ·413.
,, 27, ,, 22 ,, ,, for 3·06 *read* ·306.
,, 92, ,, 7 ,, ,, for Mandlin *read* Maudlin.
,, 108, ,, 16 ,, bottom, for discover *read* discoverer.
Ibid for Ingelstromite *read* Igelstromite.
,, 134, line 13 ,, bottom, for detatched *read* detached.
,, 135, headline and throughout, for Steelite *read* Steeleite.
,, 135, line 5, for two islands *read* Two Islands.
,, 135, ,, 6, from bottom, for Fenchtwanger *read* Feuchtwanger.
,, 163, bottom line, for Mob's *read* Mohs'.
,, 211, line 5, from bottom, for limesone *read* limestone.

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